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the limit and will probably enable such craft to cruise about three quarters of the days of the year. A misprint on page 63 states the length of the German "Zeppelin" as 85 feet instead of 414 feet.

A rather scant chapter follows on flying machines, but it can be profitably studied to ascertain the various steps which have led to the success of the last two years.

After devoting one chapter to kites and another to parachutes, both of which are fairly well written, the author passes to military ballooning, in which he is evidently thoroughly proficient. He takes up its development, describes its uses in the Franco-Prussian war, and then devotes two chapters, the ablest in the book, to the modern organization of military ballooning in some fourteen different countries. This brings us to chapter XVI., Balloon Construction and the Preparation of the Gas, followed by one on Instruments, and then follows Ballooning as a Sport, in which the author is evidently an adept, having made many such expeditions and relating them in an entertaining way.

Chapter XIX., on Scientific Ballooning describes the various journeys (in some of which the scientists lost their lives) made to ascertain the laws of decrease of air pressure, of temperature changes, of saturation, of the composition of the air, of its electrical and its acoustical properties. The greatest authentic height attained by man has been 35,500 feet, while kites have been flown to 21,100 feet and unmounted balloons with recording instruments (ballons-sondes), have reached 85,000 feet (16.1 miles) and have furnished data which will presently be utilized in foretelling the weather.

The next six chapters treat of balloon photography, of the outfit required, of the interpretation of photographs, of the uses of kites and of the methods for interpreting the bird's-eye views obtained for topographical purposes, in all of which the author is evidently an expert. He has also had much experience with carrier pigeons and devotes a chapter to them. The reader may be surprised at the statement quoted that the mean speed of these birds is only about 26 miles

an hour; feats mentioned in sporting books having been probably accomplished by the aid of the wind. Swallows fly faster than pigeons, but efforts to train them have failed so far.

The last chapter is on Balloon Law. The author states that such law can hardly be said to exist, but "that some sort of international regulation will be necessary in the future, seeing that balloons are now much more common than they were and that the dirigible air-ship is a practicable possibility."

The book is well written and well translated. Its perusal will enable the reader to follow understandingly the great advances since 1906 which are now in process of evolution.

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*Laboratory Exercises in Physical Chemistry.*

By FREDERICK H. GETMAN, Ph.D. Second Edition. Pp. x + 285. New York, John Wiley & Sons. 1908.

The first edition of this laboratory manual was issued in 1904. Its author had set for himself the task of selecting for American students only such exercises as are typical, describing these in the clearest way possible, giving all reasonable discussion of theory and directions for work, and saving the student the labor of searching out his needs in such volumes as Ostwald's "Physiko-Chemische Messungen" and Traube's "Physikalisch-Chemische Methode." These must continue to be standard authorities, but with such wealth of detail and so many references to the German literature of the subject as to be often discouraging to the student who is not already well advanced.

While physical chemistry is now fairly differentiated as an individual branch of physical science, a laboratory manual on this subject is necessarily restricted in range, and the demand for it can never be large. Dr. Getman's aptness in clear statement and good arrangement is manifest, even without more than a cursory examination of the book. The best evidence that he was successful in giving satisfaction to students of his favorite subject is the unexpected discovery that a new

edition is demanded within less than four years. This edition is slightly enlarged to the extent of about forty pages. A short chapter on thermostats has been inserted, devoted chiefly to the toluene regulator for temperatures both above and below the ordinary laboratory temperature. The chapters on electric conductivity and electromotive force have been enlarged, as are also those on solubility and chemical dynamics. The former short chapter on measurement of dielectric constants has been expanded to include that of radioactivity by use of the micro-electroscope and the electrometer. Among the reference tables at the end of the book has been now included one for the calculation of the dissociation constant.

The volume is to be commended to students of physical chemistry and will be quite sure to maintain its character for usefulness that has been already well established.

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*Mosquito Life*: The habits and life cycle of the known mosquitoes of the United States; methods for their control; and keys for easy identification of the species in their various stages. An account based on the investigations of the late James William Dupree, M.D., surgeon general of Louisiana, and upon original observations by the writer. By EVELYN GROESBECK MITCHELL, A.B., M.S. (Illustrated.) Pp. xxii + 281; 54 figures, 10 half-tone plates. New York and London, G. P. Putnam's Sons, The Knickerbocker Press. 1907.

The title is long—too long, too comprehensive, and not entirely accurate; for by her own showing a goodly portion of Miss Mitchell's book is based upon the observations of others than Dr. Dupree and herself. A brief and altogether appreciative biographical sketch of Dr. Dupree forms the major portion of the introduction and throughout the book are quotations from Dr. Dupree's notes; the text sometimes forced so as to bring them in fittingly. Indeed the book suffers from too much quotation, and in her anxiety to do

justice to authors Miss Mitchell has sometimes lost in continuity of statement.

Nevertheless the book is interesting, on the whole very accurate and as nearly complete as a work on a living topic on which many persons are engaged can ever be. Miss Mitchell has a somewhat racy style, which prevents the book from becoming dull, wherever she herself speaks. For example, in dealing with the "buzzing" she says:

There is, to the writer, nothing on earth so irritating as the shrill piping and shrieking right in one's ear just as one is comfortably drifting off into peaceful slumber. It rouses one up like a fire alarm. The victim snatches wildly at the air, thinking unutterableness, with the general result of a self-inflicted thumped head and the escape of the tiny offender.

For a book which makes a popular appeal the writer gives a surprising amount of strictly technical information. The chapters are arranged so as to bring out even the details of structure in all stages and the habits of the insects are elaborated at considerable length. In the life histories there is much detail and some of it, in the nature of breeding records, seems rather out of place.

In dealing with structures the author is at her best and speaks from personal knowledge; her drawings in illustration are good, and her comments on the bearing and importance of the structures are usually justified. As to the classification, that is in so chaotic a condition at the present time that no criticism is justifiable. Miss Mitchell follows Coquillett in general, and Mr. Coquillett is at least good authority.

An important feature in a book of this kind is the discussion of the relation of mosquitoes to disease and that is up-to-date and in a general way adequate. There is nothing new or original, the quotations from Dr. Dupree adding little, if at all, to our knowledge, though they do bring out the close connection of the Doctor's work with the yellow-fever investigations. The discussion, in the appendix, on Mosquitoes and Leprosy is inconclusive, and might have been omitted without loss.

The chapter on collecting and laboratory